

TITLE OF THE INVENTION

KIMCHI REFRIGERATOR

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of Korean Application No. 2003-28239, filed May 2, 2003, in the Korean Intellectual Property Office, the disclosure of which is incorporated herein by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a kimchi refrigerator, and, more particularly, to a kimchi refrigerator having an improved control panel, which enables a user to conveniently control the kimchi refrigerator.

2. Description of the Related Art

[0003] Conventional kimchi refrigerators maintain a temperature of a storing compartment at 0°C unlike general refrigerators, which maintain a temperature thereof between 5°C -7°C. This temperature is maintained to achieve a desirable taste of kimchi during a long period of refrigeration.

[0004] Recently, a fermenting technique has been additionally developed, allowing a user to select various storing conditions, such as temperature and time.

[0005] Additionally, conventional kimchi refrigerators control whether to supply a refrigerant by comparing a temperature at the interior of the kimchi refrigerator sensed by a temperature sensor with a predetermined setup temperature using a microprocessor. The storing conditions, such as the predetermined setup temperature, are predetermined and correspond to functions, which are selected through a control panel of the kimchi refrigerator.

[0006] As shown in FIG. 1, the control panel of the kimchi refrigerator comprises: a display 2 displaying functions which can be selected by a user; input keys 3 corresponding to respective

functions which selectively input displayed functions; and LEDs 5 displaying the functions selected by a user by emitting light.

[0007] The functions, which can be selected by a user, are semi-permanently displayed in the display 2. A user selects desirable functions by pushing the input keys 3, which correspond to the functions he/she wants to select.

[0008] However, since the functions are displayed in the display 3 as a brief word or a simple image, a user cannot easily understand the meaning of the brief word or the simple image. Consequently, he/she has to refer to a manual of the kimchi refrigerator. Also, he/she may select inappropriate functions by mistake. This results in food, stored in the kimchi refrigerator, going bad.

SUMMARY OF THE INVENTION

[0009] It is an aspect of the present invention to provide a kimchi refrigerator having an improved control panel enabling a user to conveniently select appropriate functions without a manual thereof.

[0010] To achieve the above and/or other aspects, according to the present invention, there is provided a kimchi refrigerator having a first storing unit to store function selecting information, and a control panel having a display displaying the function selecting information read from the first storing unit and a key input part to input functions selected by a user, comprising: a second storing unit to store detail function selecting information corresponding to each of the function selecting information; a voice output part to output the detail function selecting information read from the second storing unit; and a function selecting controller controlling the function selecting information and the detail function selecting information to be respectively displayed in the display and the voice output part based on manipulation of the key input part.

[0011] Additional and/or other aspects and advantages of the invention will be set forth in part in the description which follows and, in part, will be obvious from the description, or may be learned by practice of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] These and/or other objects and advantages of the present invention will become apparent and more readily appreciated from the following description of the embodiments, taken in conjunction with the accompany drawings, of which:

FIG. 1 is a view illustrating a configuration of a control panel of a conventional kimchi refrigerator;

FIG. 2 is a perspective view of a kimchi refrigerator according to an embodiment of the present invention;

FIG. 3 is a control block diagram of the kimchi refrigerator shown in FIG. 2;

FIG. 4 is an exemplary view illustrating configuration of a control panel of the kimchi refrigerator shown in FIG. 2; and

FIG. 5 is an exemplary view illustrating function selecting information displayed on a display on the basis of a manipulation of the control panel of the kimchi refrigerator shown in FIG. 2.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Reference will now be made in detail to embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below to explain the present invention by referring to the figures.

[0014] FIG. 2 is a perspective view of a kimchi refrigerator according to an embodiment of the present invention. As shown in FIG. 2, the refrigerator comprises a main body 13 having door openings facing toward a front and a top thereof, a pair of front doors 15 provided in the front of the main body 13 opening and closing the front facing door openings and a pair of top doors 17 provided in the top of the main body 13 opening and closing the top facing door openings.

[0015] The main body 13 is substantially box shaped. A control panel 11 is provided in a front and upper part of the main body 13. The control panel 11 allows a user to select storing conditions of various kinds of food, such as kimchi, which are stored in a storing compartment. Left and right side and top and bottom storage compartments are provided in insides of the front

doors 15 and the top doors 17. Each storing compartment accommodates storing vessels, which store food, such as kimchi.

[0016] Also, a component compartment (not shown) separated from the storing compartments is formed in an inside of the kimchi refrigerator. A compressor to compress a refrigerant and a condenser to condense the refrigerant supplied from the compressor is provided inside of the component compartment.

[0017] Further, heaters, which radiate heat by power, which is supplied to maintain the temperature of the storing compartments at a predetermined temperature, and evaporators, cooling the respective storing compartments by using the refrigerant supplied from the condenser, are provided in a surrounding wall of the storing compartments.

[0018] Temperature sensors 25, being adjacent to a top of the evaporators, sensing the temperature of the respective storing compartments, are provided in upper portions of the left and right and top and bottom storing compartments. Refrigerant supplying valves 27, to supply or cut off the refrigerant, are provided in refrigerant pipes connecting the condenser and the evaporators.

[0019] A controller 21 controlling operation of components, such as the compressor, and the refrigerant supplying valves 27 on the basis of the temperature sensed by the temperature sensors 25 and functions selected through the control panel 11 is provided in a side of the main body 13.

[0020] The kimchi refrigerator having the above configuration operates as follows. Initially, power is supplied through a power supplying part 23. Functions are then selected through the control panel 11, and the compressor compresses the refrigerant according to the selected functions. The refrigerant compressed by the compressor is supplied to the condenser through the refrigerant pipes. The refrigerant condensed by the condenser is supplied to the evaporators and cools each storing compartment. After cooling each storing compartment, the refrigerant flows out from the evaporators and returns to the compressor.

[0021] The controller 21 controls each storing compartment to be cooled to an appropriate temperature by appropriately turning the refrigerant supplying valves 27 on and off based on the temperature of each storing compartment sensed by the temperature sensors 25.

[0022] Since FIG. 2 is illustrated to describe a schematic configuration and an operation of the kimchi refrigerator, details, such as the number of the front and top doors 15 and 17, respectively, and layout and the number of the other components, are not intended to limit the scope of the present invention.

[0023] FIG. 3 is a control block diagram of the kimchi refrigerator according to the present invention. FIG. 4 is an exemplary view illustrating configuration of a control panel of the kimchi refrigerator according to the present invention. As shown in FIGS. 3 and 4, the kimchi refrigerator according to the present invention comprises a first storing unit 35 storing function selecting information and the control panel 11 having a display 33 which displays the function selecting information as read from the first storing unit 35 and a key input part 31 through which inputting functions are selected by a user.

[0024] The kimchi refrigerator according to the present invention further comprises the power supplying part 23 supplying power, the temperature sensors 25 sensing the temperature of each storing compartment, the refrigerant supplying valves 27 supplying and cutting off the refrigerant, and the controller 21 which confirms storing conditions, such as temperature and/or time, corresponding to the selected functions through the control panel 11. The controller 21 further controls the refrigerant supplying valves 27 based on the storing conditions and the temperature sensed by the temperature sensors 25.

[0025] The kimchi refrigerator according to the present invention further comprises a second storing unit 37 storing detail function selecting information corresponding to each function selection information, a voice output part 39 outputting the detail function selecting information which is read from the second storing unit 37 as voice, and a function selecting controller 30 controlling the function selecting information and the detail function selecting information to be respectively displayed in the display 33 and the voice output part 39 based on manipulation of the key input part 31.

[0026] The first storing unit 35 stores the function selecting information to be displayed in the display 33 of the control panel 11.

[0027] The function selecting information comprises at least a plurality of functions to be selected by a user and words describing the selecting method which are descriptive enough that a manual is not required. For example, the function selecting information may comprise images

and words to be displayed in the display 33, such as the images and words corresponding to reference numbers 51, 52, 53, 54, 56, 57, and 58 in FIG. 5, which illustrates the display 33 displaying the function selecting information. Also, the function selecting information may comprise an error message 55 (refer to FIG. 5).

[0028] The control panel 11 comprises the display 33 and the key input part 31 (refer to FIG. 4). The display 33 displays the function selecting information of the first storing unit 35 (refer to FIG. 5).

[0029] The display 33 is formed with an LCD. The function selecting information to be displayed in the display 33 is arranged in order as shown in FIG. 5.

[0030] If any one of the functions is selected, selecting information of a hierarchically stored lower level function, which corresponds to the selected function, is displayed in the display 33.

[0031] Also, the displayed function selecting information is formed with a plurality of functions to be selected by a user. In an embodiment of the invention, one of the plurality of functions flickers in a predetermined period. Herein, the flickering function is a function selectively inputted through a confirming button 43 (to be described later) as shown in FIG. 4. Hereinafter, a flickering state is referred to as a selection standby state.

[0032] The key input part 31 is provided in accordance with the confirming button 43 to select desirable functions, and a right moving button 41a and a left moving button 41b to move selections to the desiring functions.

[0033] The right and left moving buttons 41a and 41b enable one of the functions displayed in the display 33 to be in the selection standby state. As an example, if a user pushes the right moving button 41a, a right side function relative to the present function in the selection standby state is thereby selected to be in the standby state. If a right side function relative to the present function in the selection standby state does not exist, either an error message is displayed, or a leftmost function of the functions displayed in the display 33, is selected to be in the selection standby state.

[0034] The second storing unit 37 stores the detail function selecting information corresponding to the function selecting information. Herein, the detail function selecting information is stored to

be audibly outputted (e.g., as a voice speaking words describing the function selecting information).

[0035] For example, when the function selecting information corresponding to the reference number 56 in FIG. 5 is displayed, a voice message discusses a manipulation method. The message states, for example, "please, select storing functions you want by using the left or right moving button. Push the confirming button after selecting, please."

[0036] Also, for example, when a user selects a fermenting function not to be set up by mistake, the error message 55 (refer to FIG. 5) is displayed in the display 33. In this case, the function selecting information, which is the error message 55, is displayed in the display 33. Simultaneously, an error message, which states, for example, "no fermenting function in this storing compartment. If you want to use the fermenting function, use other storing compartment, please", may be stored as the detail function selecting information to be outputted as a voice type.

[0037] The voice output part 39 outputs the detail function selecting information which is read from the second storing unit 37, as a voice type. The voice output part 39 comprises a voice circuit and a speaker provided in an outside or inside of the main body 13 of the kimchi refrigerator. Additionally, an audio apparatus provided with the voice circuit and the speaker may be applied to the voice output part 39.

[0038] The function selecting controller 30 controls the function selecting information and the detail function selecting information to be respectively displayed in the display 33 and the voice output part 39 in accordance with manipulation of the key input part 31. Simultaneously, the function selecting controller 30 transmits selection signals corresponding to the selected functions to the controller 21, so that the controller 21 controls the refrigerant supplying valves 27 based on storing conditions, such as the temperature and time, corresponding to the selection signal and the temperature sensed by the temperature sensors 25.

[0039] If manipulation of the key input part 31 occurs, that is, if a user pushes the confirming button 43, the function selecting controller 30 searches a lower-level function selecting information, which is hierarchically connected to the function selecting information displayed in the display 33, in the first storing unit 35 and displays the lower-level function selecting information in the display 33. Simultaneously, the function selecting controller 30 searches the

detail function selecting information corresponding to the lower-level function selecting information in the second storing unit 37 and outputs the detail function selecting information through the voice output part 39.

[0040] The function selecting information and the detail function selecting information may be managed separately or as one DB (Database). Herein, a corresponding table, which stores the corresponding relation between the function selecting information and the detail function selecting information, may be separately provided. Similarly, a hierarchical table, which stores the relation between an optional function selecting information and the lower-level function selecting information hierarchically connected therewith, may be also separately provided.

[0041] FIG. 5 is an exemplary view illustrating function selecting information displayed on the display 33 based on the manipulation of the control panel 11 of the kimchi refrigerator according to an embodiment of the present invention.

[0042] For example, if power is supplied to components of the kimchi refrigerator including the control panel 11, the detail function selecting information, such as an initial image and greeting, is displayed or outputted in the display 33 and the voice output part 39.

[0043] If a predetermined time, for example, 5 seconds, passes, the function selecting information corresponding to the reference number 51 in FIG. 5 is displayed in the display 33. Simultaneously, detail information, such as the following example may be stated. This example includes the following instruction: "confirm setup states of all storing compartments, please. A left storing compartment is for kimchi, a top storing compartment is for meat/fish, a bottom storing compartment is for new rice/cereal, and a left storing compartment is for kimchi." These instructions are outputted through the voice output part 39, informing the setup state of all storing compartments.

[0044] If a user selects a certain storing compartment to change a setup condition of the storing compartment or pushes a wrong button by mistake, an error message 52 is displayed in the display 33. Simultaneously, the detail function selecting information, which informs the user of a manipulation method is outputted. That output may include the following statement: "select one of storing compartments at first owing to setup of a lock function, please".

[0045] The function selecting information corresponding to the reference number 53 in FIG. 5 is displayed in the display 33. Simultaneously, the detail function selecting information, such as “push the storing compartment selecting button provided in the left side of the control panel, please”, is outputted through the voice output part 39.

[0046] If a user pushes the left storing compartment selecting button, the function selecting information corresponding to the reference number 54 in FIG. 5 is displayed in the display 33. The detail function selecting information informing the user of the manipulation method, is outputted. That output may include the following statement: “select one function you want of storing/fermenting functions by using the leftward or rightward moving button, please. Push the confirming button after selecting is completed, please”.

[0047] When a user selects the fermenting function while the fermenting function is not set up in the storing compartment, the function selecting information, such as the error message 55, is displayed in the display 33. The detail function selecting information informing the user of the manipulation method, is outputted. That output may include the following statement: “no fermenting function in this storing compartment. Please, use the other storing compartment”.

[0048] If a user selects the storing function and pushes the confirming button 43, the function selecting information corresponding to the reference number 56 in FIG. 5 is displayed in the display 33. The detail function selecting information informing the user of the manipulation method is outputted. That output may include the following statement: “select one function you want of storing/fermenting functions by using the leftward or rightward moving button, please. Push the confirming button after selecting is completed, please”.

[0049] If a user selects a kimchi (medium) function, the function selecting information corresponding to the reference number 57 in FIG. 5 is displayed in the display 33. The detail function selecting information informing the user of the manipulation method is outputted. That output may include the following statement: “You selected the kimchi (medium) storing condition for the left storing compartment. States of all storing compartments are displayed in 5 seconds”. The function selecting information corresponding to the reference number 58 in FIG. 5 is displayed in the display 33 in 5 seconds.

[0050] With the above configuration, the function selecting information and the detail function selecting information are stored. The function selecting information is displayed in the display,

and the detail function selecting information informing the manipulation method, and so on detailed relative to the function selecting information, is outputted as a voice type. Accordingly, the kimchi refrigerator is easily controlled and a user can conveniently select an appropriate function without a manual for the kimchi refrigerator.

[0051] As described above, according to the present invention, a kimchi refrigerator, which is relatively easily controlled and allows a user to conveniently select an appropriate function without a manual by giving detail information on manipulation through a voice output part and an LCD display of a control panel thereof, are provided.

[0052] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.